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A new species of *Porina* (lichenized Ascomycota, Porinaceae) from Tasmania

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Abstract

Porina australis sp. nov. (lichenized Ascomycota, Porinaceae) is described from seasonally inundated, siliceous rocks in the Frankland River, north-western Tasmania, Australia. It has a thin, medium yellow-brown to dark rusty red-brown, rimose to areolate thallus, prominent, medium-sized, outwardly blackish perithecia that are mainly orange-brown within, a comparatively thick, pale excipulum and fusiform or narrowly oblong, 7(–9)-septate ascospores of 37–65 × 5–8 µm.

Introduction

The lichen genus *Porina* Ach., with almost 400 accepted species, is most diverse on bark, leaves and rock in the tropics and subtropics, but also occurs in warm- and cool-temperate regions (McCarthy 2013). Approximately 45 percent of species are primarily corticolous, with 35 percent foliicolous and 20 percent saxicolous; fewer than 10 percent of taxa occur on more than one broad substratum type. The genus is characterized by a crustose thallus lacking lichen substances and with *Trentepohlia* (bark- and rock-inhabiting species) or *Phycopeltis* (leaf-inhabiting taxa) as the photobiont, perithecioid ascomata with a vestigial to well-developed, variously pigmented and mainly paraplectenchymatous involucrellum, a prosoplectenchymatous excipulum, a non-amyloid hymenium with simple to very sparingly branched paraphyses and thin-walled, unitunicate, 8-spored asci, and hyaline, predominantly fusiform and multiseptate to muriform ascospores (Clauzade and Roux 1985, McCarthy 1993, 2000, 2001, 2013, Harris 1995, Galloway 2007, Lücking 2008, Orange et al. 2009, Orange 2013, Harada 2015, 2016).

Currently, the Australian lichen flora includes 89 species of *Porina*, mainly occurring on and to the east and south of the Great Dividing Range, with 12 others found on Christmas Island, Lord Howe Island and Norfolk Island (McCarthy 2001, 2013). The 25 species known from Tasmania are predominantly southern Australian, southern Australasian or endemic (McCarthy & Kantvilas 2000). In this contribution, *P. australis* is described as new from seasonally inundated, siliceous rocks in north-western Tasmania.

Methods

Observations and measurements of photobiont cells, thallus and ascomatal anatomy, asci and ascospores were made on hand-cut sections mounted in water. Sections of ascomata were also observed in 10% potassium hydroxide (K), and the hymenium was irrigated with Lugol's Iodine (I), with and without pretreatment in K.

New Species

Porina australis P.M.McCarthy & Kantvilas, **sp. nov.**

MycoBank No.: MB 818782

Characterized by 1) the dull, medium yellow-brown to dark rusty red-brown, rimose to areolate, ecorticate thallus, 2) prominent, perithecioid ascomata, 0.24–0.5 mm diam., outwardly blackish, internally orange-brown, K+ intensifying and incorporating thalline tissues, 3) a thick, uniformly pale excipulum, 4) elongate-fusiform asci lacking an apical, chitinoid ring, and 5) fusiform or narrowly oblong, 7(–9)-septate ascospores measuring 37–65 × 5–8 µm.

Type: Australia, Tasmania, Frankland River, at bridge on Blackwater Road, 41°11'S, 144°52'E, alt. 80 m, on seasonally inundated, siliceous rocks in river bed, *G. Kantvilas 463/15*, 10 Nov 2015; holotype HO581536.

Thallus crustose, epilithic, dull medium yellow-brown to dark rusty red-brown, to c. 3 cm wide, determinate, continuous to sparingly rimose (and 20–50 µm thick) or areolate (and 70–120 (–150) µm thick), ecorticate; areoles angular, usually irregular in shape, plane, ±smooth, 0.2–1 mm in maximum extent, the rimae narrow and deep, penetrating almost to the substratum; thallus subgelatinous when wet, the rimae disappearing; prothallus not apparent; basal layer absent. *Algae Trentepohlia*; cells subglobose to broadly ellipsoid, 10–18(–25) × 8–12(–18) µm, solitary or in short filaments, occupying the full thickness of the thallus; interstitial hyphae thin-walled, short-celled, 2.5–4 µm wide. *Ascomata* perithecia, numerous, solitary or in short rows or small clusters, one-third immersed to almost superficial, becoming hemispherical to subglobose at maturity and often slightly constricted at the base, (0.24–)0.39(–0.5) diam. [n = 50], outwardly blackish brown to black above, the lower parts often slightly paler and incorporating thalline tissues at maturity; apex rounded or slightly flattened; ostiole inconspicuous or in a broad, shallow depression, or outwardly visible as a minute papilla. *Involucrellum* extending to mid-way down the sides of the excipulum, or to almost level with the base, 60–100 µm thick, apically and subapically free of algae, laterally incorporating photobiont cells, especially towards the surface; in section, the outermost zone dark red-brown, 12–20 µm thick, the cells rounded, thick-walled, 4–7 µm diam., subtended by a medium orange-brown paraplectenchyma of thick-walled, irregular cells 3–5 µm wide; cells adjacent to the excipulum subprosoplectenchymatous, 4–6 × 2–3 µm; all reddish and orange, involucrellar pigments intensifying in K (i.e. '*Porina* yellow'); crystals lacking. *Excipulum c.* 20 µm thick near the apex, 35–45 µm thick at the sides and base of the centrum, uniformly hyaline to pale yellowish brown; cells prosoplectenchymatous and periclinally elongate, 5–10 × 2–3 µm. *Subhymenium* 25–35 µm thick. *Hymenium* I–. *Paraphyses* simple to very sparingly branched, 0.8–1.2 µm thick. *Periphyses* subapical, sparse, simple, 10–15 × 0.8–1.2 µm. *Asci* 8-spored, elongate-fusiform, with rounded apices that lack a chitinoid ring, 105–165 × 10–17 µm. *Ascospores* hyaline, 7(–9)-septate, fusiform or narrowly oblong, or broader towards the distal end and tapering more gradually towards the proximal, straight or slightly curved or faintly sigmoid, overlapping and biseriate or triseriate in the ascus, occasionally slightly constricted at the septa, (37–)48(–65) × (5–)7(–8) µm [n = 65]; apices rounded, subacute or acute, occasionally the distal end more rounded; perispore not apparent or up to 2 µm thick; spore contents usually granulose and guttulate. *Pycnidia* not seen. **Figs 1, 2.**

Relationships: *Porina australis* is characterized by the combination of thalline and ascomatal attributes listed above, most significantly the prominent, outwardly blackish perithecia that are much paler and orange-brown to dark red-brown in section (this variation due to a decreasing concentration of *Porina*-yellow from the outside in) and incorporate photobiont cells, as well as the rather thick, pale excipulum, asci lacking an apical chitinoid ring, and moderately large, predominantly 7-septate ascospores.

Comparable perithecial anatomy and 7-septate ascospores are seen in *P. howeana* P.M.McCarthy, from Lord Howe Island, but that species has perithecia 0.19–0.33 mm diam. which are much darker in section and produce ascospores 19–31 × 4–6.5 µm with a thick perispore (McCarthy 1997). The southern New Zealand lichen *P. otagensis* P.M.McCarthy is also semi-aquatic, the involucrellum is applanate to convex and purple-black in section but with embedded photobiont cells, and the ascospores are 22–33 × 6.5–10 µm (McCarthy 1999), while *P. muluensis* P.M.McCarthy & Coppins, from Borneo, has a thicker, paler thallus, larger perithecia (0.36–0.76 mm diam.) dominated by the thallus, and the ascospores are 24–42 × 3–6 µm (McCarthy & Coppins 1995). *Porina kantvilasii* P.M.McCarthy, a mainly coastal lichen from Tasmania, the south-west of Western

Australia, southern New Zealand and Campbell Island, has medium orange-brown to blackish perithecia. However, the layered involucrellum, similar to that of the new species, encloses rather than is overgrown by algal cells, and the ascospores are elongate-fusiform to filiform and only 2–4.5 µm wide (McCarthy 1993).

The predominantly pantemperate *P. guentheri* (Flot.) Zahlbr., found on damp, shaded and semi-aquatic siliceous rocks in eastern, coastal Australia and in the south-west of Western Australia, has a rimose to areolate thallus, prominent, black perithecia with an involucrellum that is uniformly green-black to purple-black in section, with a colourless to purple-black excipulum and (6–)7(–9)-septate measuring 22–50 × 3.5–6.5 µm (McCarthy 1993, 2001, Orange et al. 2009, Orange 2013). Finally, the corticolous *P. impolita* P.M.McCarthy, known from rainforest trees in south-eastern Queensland, north-eastern New South Wales, southern Victoria and Tasmania, has perithecia of almost identical size to those of *P. australis* and equally long 7-septate ascospores. However, the greenish thallus is continuous and only up to 40 µm thick, the perithecia are almost concolorous in surface view, with a thin thalline covering subtended by a uniformly pale to medium orange-brown involucrellum, while the ascospores are (6–)8(–10.5) µm wide (McCarthy 1994, 2001).

Numerous, black, hemispherical structures, 0.1–0.17 mm diam., scattered on thicker parts of the holotype, were initially thought to be pycnidia. However, they proved to be the perithecioid ascomata of an unidentified lichenicolous fungus.

Etymology: From the Latin *australis* (southern), in reference in its occurrence in Australia and globally.

Distribution and habitat: *Porina australis* is known only from the type locality, *viz.* seasonally inundated, siliceous rocks in the Frankland River, north-western Tasmania, Australia, where the river runs through extensive cool temperate rainforest. Streams in such situations are frequently poor sites for lichens, usually due to their being deeply shaded, heavily scoured by water and sediment, or periodically smothered by debris. This locality, however, was exceptional, with the river relatively wide and its bed comprised of exposed shelves of bedrock. The lichens present include characteristic saxicolous taxa such as *Paraporpidia leptocarpa* (C.Bab. & Mitt.) Rambold & Hertel and *Rhizocarpon reductum* Th.Fr., species typical of habitats subject to periodic disturbance, for example, *Baeomyces heteromorphus* Nyl. ex C.Bab. & Mitt., *Trapelia coarctata* (Sm.) M.Choisy and *Stereocaulon ramulosum* (Sw.) Räusch., and a small suite of aquatic species, including *Hymenelia lacustris* (With.) M.Choisy and an undescribed but well-known species of *Trapelia*.

References

Clauzade G, Roux, C (1985) Likenoj de Okcidenta Eŭropo. Ilustrita Determinlibro. *Bulletin de la Société Botanique du Centre-Ouest, Nouvelle Série, Numéro Spécial* 7: 1–893

Galloway DJ (2007) *Flora of New Zealand Lichens*. Revised second edition. Volume 2. (Manaaki Whenua Press, Lincoln)

Harada H (2015) Saxicolous and corticolous species of *Porina* (lichenized Ascomycota, Porinaceae) of Japan (part 1). *Lichenology* 14: 1–26

Harada H (2016) Saxicolous and corticolous species of *Porina* (lichenized Ascomycota, Porinaceae) of Japan (part 2). *Lichenology* 14: 91–118

Harris RC (1995) *More Florida Lichens including the 10¢ Tour of the Pyrenolichens*. (Privately published, New York)

Lücking R (2008) Foliicolous lichenized fungi. *Flora Neotropica Monograph* 103: 1–867

McCarthy PM (1993) Saxicolous species of *Porina* Müll. Arg. (Trichotheliaceae) in the Southern Hemisphere. *Bibliotheca Lichenologica* 52: 1–134

McCarthy PM (1994) Corticolous species of *Porina* (lichenized Ascomycotina: Trichotheliaceae) in Australia. I. *Nova Hedwigia* 58: 391–403

McCarthy PM (1997) Three new species of Trichotheliaceae from Lord Howe Island, Australia. *Lichenologist* 29: 229–236

McCarthy PM (1999) *Porina otagensis* (Trichotheliaceae), a new semi-aquatic lichen from southern New Zealand. *Lichenologist* 31: 337–340 https://doi.org/10.1006/lich.1999.0208

McCarthy PM (2000) Key to the saxicolous taxa of *Porina*. *Lichenologist* 32: 1–14 https://doi.org/10.1017/S0024282900000037

McCarthy PM (2001) Trichotheliaceae. *Flora of Australia* 58A: 105–157

McCarthy PM (2013) *Catalogue of Porinaceae*. (Australian Biological Resources Study, Canberra; http://www.anbg.gov.au/abrs/lichenlist/PORINACEAE.html; version 4 December 2013)

McCarthy PM, Coppins, BJ (1995) *Porina muluensis* sp. nov. from Sarawak. *Lichenologist* 27: 308–310 https://doi.org/10.1017/s0024282995000399

McCarthy PM, Kantvilas G (2000) A new bryophilous *Porina* from Tasmania, and notes on the diversity, habitats and biogeographical affinities of Tasmanian *Trichotheliaceae*. *Lichenologist* 32: 247–256 https://doi.org/10.1006/lich.1999.0262

Orange A (2013) *British and other Pyrenocarpous Lichens*. Version 2. (National Museum of Wales, Cardiff)

Orange A, Purvis OW, James PW (2009) *Porina* Ach. (1809). Pp. 729–737 in Smith CW, Aptroot A, Coppins BJ, Fletcher A, Gilbert OL, James PW and Wolseley PA (eds), *The Lichens of Great Britain and Ireland*. (British Lichen Society, London)

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Fig. 1. *Porina australis* (holotype). Scale bar: 2.5 mm.

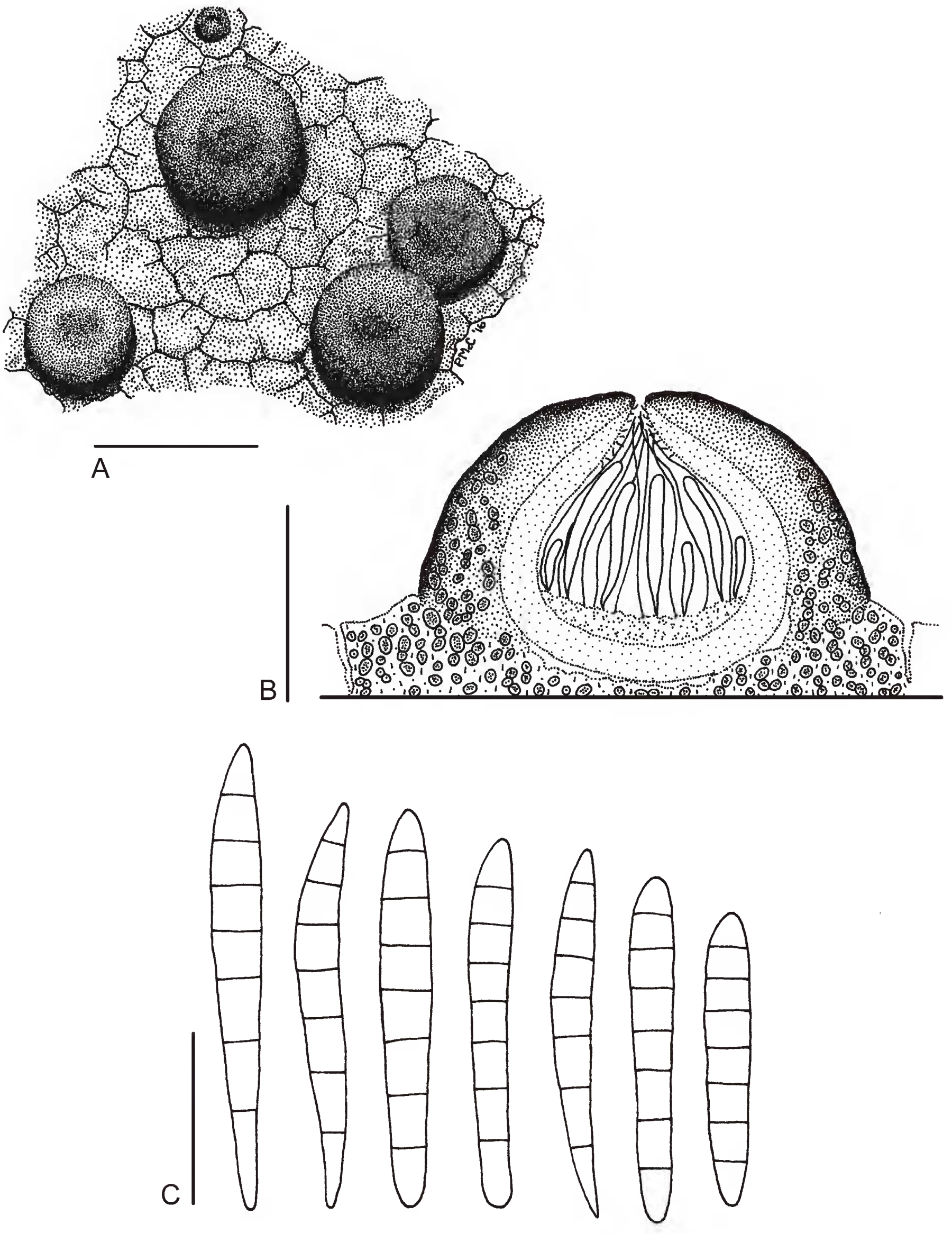

Fig. 2. *Porina australis* (holotype). **A**, habit of thallus and ascomata; **B**, sectioned ascoma and adjacent thallus (semi-schematic); **C**, ascospores. Scale bars: **A** = 0.5 mm; **B** = 0.2 mm; **C** = 20 μm.